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Research Note

Skrjabinoclava aculeata (Acuarioidea: Acuariidae) in Dunlins (*Calidris alpina*) from Both Iceland and Louisiana, U.S.A.

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ABSTRACT: *Skrjabinoclava aculeata* (Creplin, 1825) was found in 11 of 24 dunlins (*Calidris alpina hudsonia*) wintering in Louisiana. This nematode was previously reported only in dunlins from Europe (Germany) and in dunlins collected in Iceland migrating from Palaearctic and Ethiopian staging and wintering areas. This is the first report of the same species of *Skrjabinoclava* in both New and Old World waders.

KEY WORDS: *Skrjabinoclava aculeata,* Nematoda, charadriiform birds, Old and New Worlds.

Anderson and Wong (1992) recently reported mature *Skrjabinoclava aculeata* (Creplin, 1825) in the proventriculus of 68% (15/22) of dunlins (*Calidris alpina schinzii*) collected in Iceland in the spring of 1989; intensity was 12 (1–83). Larvae were not found in the birds, and it was concluded that the latter had acquired infections either on their wintering grounds in Morocco and Mauritania (Pienkowski and Dick, 1975) or on staging areas in Morecambe Bay and the Dee Estuary, Britain (Wilson, 1973; Eades, 1974), when en route to breeding areas in southwest Iceland and southeast Greenland. *Skrjabinoclava aculeata* was regarded as exclusively a parasite of dunlins wintering in Palaearctic and Ethiopian regions because it had never been found in the numerous ($N = 105$) specimens of *Calidris alpina pacifica* collected from the Pacific coast of North America or in any other shorebird species from North America (Wong and Anderson, 1987, 1990). However, *Skrjabinoclava bakeri* Wong and Anderson, 1987 (26%, 3.7 [1–11]), and *S. tupacincae* Freitas and Ibanez, 1970 (16%, 3.2 [1–24]), were fairly common in Pacific dunlins along with a few *S. pusillae* Wong and Anderson, 1987 (4%, 5.0 [3–8]), and *S. myersi* Wong and Anderson, 1987 (1%, 168).

Dunlins (*Calidris alpina hudsonia*) were collected by shooting on their wintering grounds near Port Fourchon, Louisiana, U.S.A., on 20–25 January 1988. The birds were examined for proventricular worms of the genus *Skrjabinoclava.* Specimens were washed in saline and fixed in hot glycerine alcohol with 5% glycerine. The worms were cleared for study in pure glycerine

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Table 1. Morphometric characteristics of *Skrjabinoclava aculeata* (Creplin, 1825) in dunlins (*Calidris alpina*) from Iceland and Louisiana, U.S.A.*

	Iceland	Louisiana
Males	$N = 20$	$N = 10$
Length	4.0 (3.6–4.3) mm	4.2 (2.8–4.4) mm
Maximum width	107 (85–120)	126 (112–146)
Buccal cavity	150 (128–183)	197 (160–215)
Deirids†	74 (60–88)	86 (79–92)
Nerve ring†	177 (146–206)	185 (170–199)
Excretory pore†	201 (180–249)	219 (189–249)
Muscular esophagus	221 (192–280)	216 (192–240)
Glandular esophagus	1.0 (0.8–1.2) mm	1.0 (0.7–1.4) mm
Left spicule	568 (530–620)	572 (530–630)
Right spicule	140 (125–148)	137 (111–149)
Tail	147 (118–166)	145 (120–164)
Females	$N = 20$	$N = 10$
Length	5.6 (5.1–6.1) mm	5.6 (4.3–6.4) mm
Maximum width	180 (160–220)	208 (184–240)
Buccal cavity	170 (145–193)	234 (182–241)
Deirids†	102 (78–115)	107 (94–122)
Nerve ring†	192 (165–218)	215 (201–239)
Excretory pore†	242 (210–287)	259 (220–308)
Muscular esophagus	254 (220–290)	246 (188–360)
Glandular esophagus	1.2 (1.0–1.3) mm	1.3 (1.1–1.5) mm
Vulva‡	329 (285–385)	319 (240–367)
Tail	114 (90–135)	103 (85–124)
Eggs	20–22 × 32–38	21–23 × 33–35

* Mean and range in micrometers except where indicated otherwise.
† Distance from anterior extremity.
‡ Distance from posterior extremity.

or lactophenol. The specimens have been placed in the Helminthological Collection of the United States National Museum (Nos. 82846–82847).

We were surprised to discover that the specimens found in 11 of 24 (46%) dunlins examined from Louisiana were *Skrjabinoclava aculeata.* Intensity was 3.4 (2–5), and the male female ratio was 0.7:1. *Calidris alpina hudsonia* breeds in the central Canadian arctic and winters in the Gulf coast of the U.S.A. The morphometric correspondence between the nematodes from dunlins from Iceland and those from Louisiana was remarkably close (Table 1), and all morphologic characters were indistinguishable (Figs. 1–9). This is the first time the same species of *Skrjabinoclava* has been found in shorebirds in both the New and Old Worlds.

Two hypotheses for this unusual distribution are outlined below, both of which require additional study. Various points must be kept in mind for either hypothesis. First, species of *Skrjabinoclava* are heteroxenous, utilizing crustaceans such as amphipods as intermediate hosts (Wong and Anderson, 1990). Second, transmission occurs in wintering or staging areas (i.e., not on the breeding grounds [Wong and Anderson, 1990]). Third, charadriiforms are thought to have evolved during the Tertiary and early glaciations to have been responsible for the formation of species living in the tundra (Larson, 1957). Finally, the last glaciation was responsible for the distribution of existing subspecies, which developed in tundra refuges (Larson, 1957).

Skrjabinoclava aculeata may be an evolutionary stable parasite that occurred in dunlins prior to the time when subspecies of the host evolved. If so, the absence of *S. aculeata* in New World *C. a. pacifica* is somewhat problematic. However, the parasite could have been retained in some populations of the host and not others. Greenwood (1984, 1986) suggested that *C. a. pacifica* (which breeds in southern Alaska) and *C. a. hudsonia* (which breeds in the central Canadian arctic) originated from a parent population occupying a refuge in central North America whereas *C. a. arctica* (which breeds in Greenland) and *C. a. schinzii* (which breeds in Iceland, Britain, and northwestern Europe) originated in

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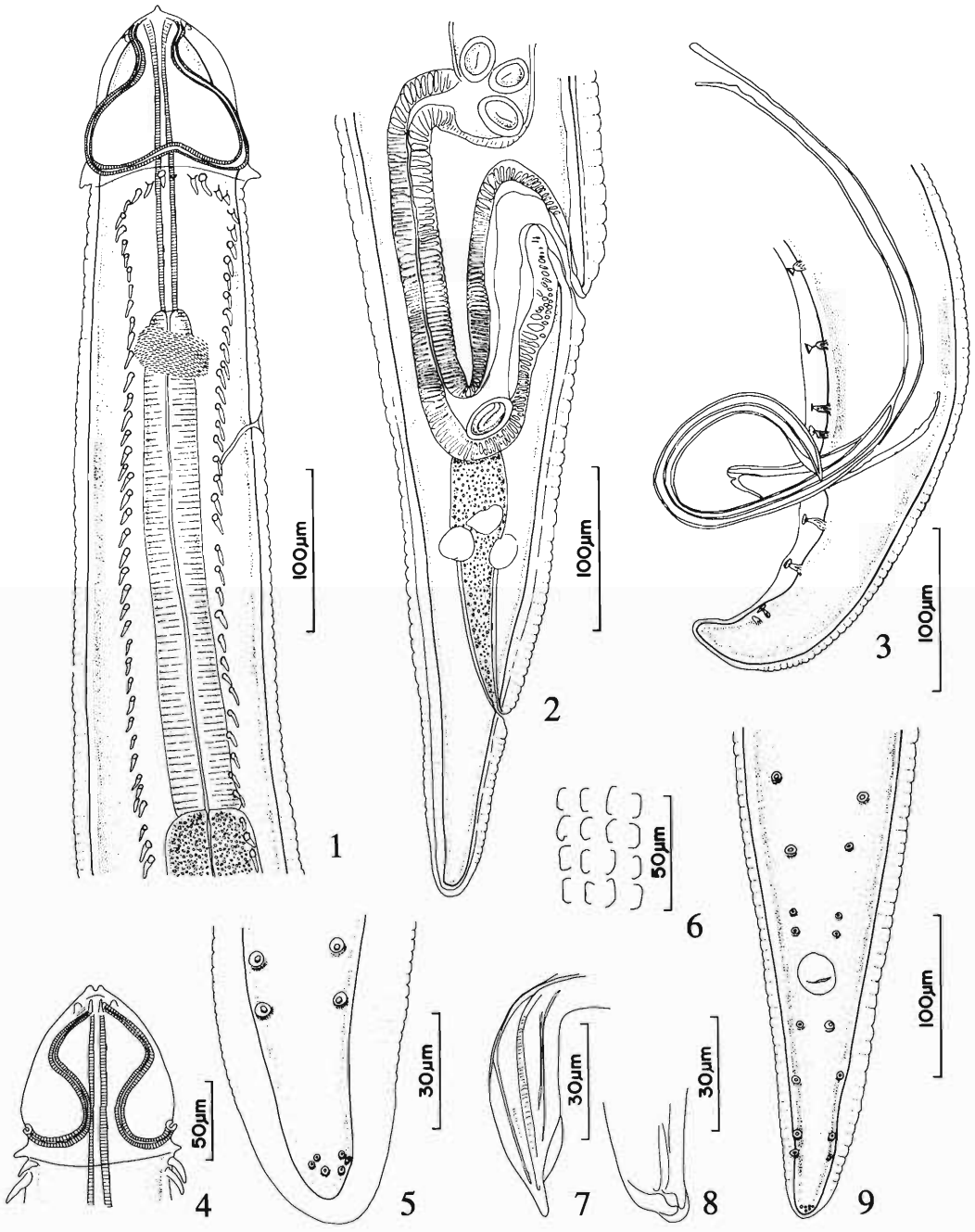

Figures 1–9. Morphology of *Skrjabinoclava aculeata* from *Calidris alpina hudsonia* from Louisiana, U.S.A. 1. Anterior region of male, lateral view. 2. Posterior region of female, lateral view. 3. Caudal end of male, lateral view. 4. Cephalic extremity of male, ventrolateral view. 5. Distal end of tail of male, ventral view. 6. Area rugosa. 7. Left spicule, distal end. 8. Right spicule, distal end. 9. Caudal region of male, ventral view.

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French and central Siberian refuges. In contrast to Greenwood, Wenink et al. (1993) suggested that *C. a. pacifica* was derived from birds from a Beringia refuge. They also concluded that *C. a. hudsonia* was widely separated from other dunlins.

Skrjabinoclava aculeata may have originated as a parasite of dunlins after the time when subspecies of the host evolved and, thus, originally have been a parasite of only 1 subspecies of host. Subsequently, it spread to a second subspecies. This hypothesis requires spread of the parasite from 1 continent to another in recent times, which, in view of our knowledge of where the parasite is transmitted, is somewhat difficult to envision but cannot be ruled out.

Future studies using molecular methods might help to determine whether the parasites from Iceland and North America are the same or sibling species.

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